

- C1
1. (Amended) An electro-chemical deposition system, comprising:
a mainframe having a mainframe wafer transfer robot;
a loading station disposed in connection with the mainframe;
one or more electrochemical deposition cells disposed in connection with the mainframe; and
a thermal anneal chamber disposed in connection with the mainframe.

2. The system of claim 1 wherein the thermal anneal chamber comprises a rapid thermal anneal chamber having a heater plate.

3. The system of claim 2 wherein the heater plate comprises an atmospheric pressure heater plate.

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4. (Amended) The system of claim 1, further comprising:
a system controller adapted to control operations of one or more components of the electro-chemical deposition system.

5. The system of claim 4, wherein the thermal anneal chamber further comprises a gas inlet adapted to introduce one or more gases into the thermal anneal chamber.

6. The system of claim 5 wherein the system controller is adapted to control the gas inlet to the chamber to provide a chamber environment having an oxygen content of less than 100 parts per million.

7. The system of claim 6 wherein the gas inlet is connected to a nitrogen gas source to introduce nitrogen into the chamber.

8. The system of claim 6 wherein the gas inlet is connected to a nitrogen gas source and a hydrogen gas source to introduce nitrogen and hydrogen into the chamber, wherein the hydrogen content is maintained at less than about 4%.

10. The system of claim 1 wherein the loading station comprises:
i) one or more wafer cassette receiving areas; and
ii) one or more loading station wafer transfer robots for transferring a wafer between the loading station and the mainframe.

10. The apparatus of claim 9, wherein the thermal anneal chamber is disposed in connection with the mainframe through the loading station and the one or more loading station wafer transfer robots are adapted to transfer a wafer between the loading station and the thermal anneal chamber.

11. The apparatus of claim 10, further comprising:
a spin-rinse-dry (SRD) station disposed on the mainframe at a position adjacent the loading station.

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12. (Amended) A method for depositing metal on a substrate, comprising:
electro-chemically depositing a metal layer on the substrate within an electro-chemical deposition system, the electro-chemical deposition system comprising:
a mainframe having a mainframe wafer transfer robot;
a loading station disposed in connection with the mainframe;
one or more electrochemical deposition cells disposed in connection with the mainframe; and
a thermal anneal chamber disposed in connection with the mainframe;
and
annealing the substrate in the thermal anneal chamber disposed in connection with the mainframe.

13. The method of claim 12, further comprising:
performing a spin-rinse-dry process on the substrate before annealing the substrate.

14. The method of claim 12, wherein the substrate is annealed in a nitrogen environment.

15. The method of claim 12, wherein the substrate is annealed in a chamber environment having an oxygen content of less than 100 parts per million.

16. The method of claim 12, wherein the substrate is annealed between about 200° C and about 450° C for between about 30 seconds and about 30 minutes.

17. The method of claim 12, wherein the substrate is annealed at about atmospheric pressure.

18. An apparatus for depositing metal on a wafer, comprising:
a mainframe having a mainframe wafer transfer robot;
a loading station disposed in connection with the mainframe;
one or more electro-chemical deposition cells disposed on the mainframe; and
one or more anneal chambers disposed in connection with the mainframe.

19. The apparatus of claim 18, wherein the one or more anneal chambers comprise one or more rapid thermal anneal chambers.

20. The apparatus of claim 18, wherein the one or more anneal chambers are disposed in connection with the mainframe through the loading station.

Please add the following new claims 21-47:

Sub 91
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21. (New) An electro-chemical deposition system, comprising:
a mainframe having a mainframe wafer transfer robots disposed therein;
a loading station disposed in connection with the mainframe having one or more loading station robots;

Sub D1) one or more processing stations disposed in connection with the mainframe, wherein each processing station comprises one or more electrochemical deposition cells; and

one or more post deposition treatment chambers disposed in connection with the mainframe.

22. (New) The deposition system of claim 21, wherein the loading station further comprises one or more cassette receiving areas and at least one wafer orienter to set a wafer.

23. (New) The deposition system of claim 21, wherein the one or more loading station robots transfer wafers between the one or more cassette receiving areas and the one or more spin-rinse-dry modules.

24. (New) The deposition system of claim 21, wherein the one or more loading station robots transfer wafers between the one or more cassette receiving areas and the one or more post deposition treatment chambers.

Sub D2) C3 25. (New) The deposition system of claim 21, wherein the one or more spin-rinse-dry modules are connected between the loading station and the mainframe.

26. (New) The deposition system of claim 21, wherein at least two electrochemical deposition cells are disposed on a first side of the mainframe and at least two electrochemical deposition cells are disposed on a second side of the mainframe.

27. (New) The deposition system of claim 26, wherein the first side and the second side of the mainframe are positioned opposite one another.

28. (New) The deposition system of claim 26, wherein the mainframe wafer transfer robot is disposed between the first and second side of the mainframe.

Sub D3
29. (New) The deposition system of claim 21, wherein the mainframe wafer transfer robot comprises a plurality of individual robot arms to provide independent access of wafers in the one or more processing stations and the one or more spin rinse dry modules.

30. (New) The deposition system of claim 29, wherein the mainframe comprises one mainframe wafer transfer robot arm for each electrochemical deposition cell.

31. (New) The deposition system of claim 21, wherein at least one of the mainframe wafer transfer robots facilitates transfer of a wafer from a face-up position to a face-down position.

32. (New) The deposition system of claim 21, wherein the one or more post deposition treatment chambers comprise one or more rapid thermal anneal chambers, one or more thermal anneal chambers, or a combination thereof.

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33. (New) The deposition system of claim 21, further comprising an electrolyte replenishing system disposed about the mainframe in fluid communication with each of the electrochemical deposition cells.

34. (New) The deposition system of claim 21, wherein the electrolyte replenishing system comprises one or more filters, one or more chemical analyzers, and one or more chemical storage tanks.

Sub D4
35. (New) The deposition system of claim 34, wherein at least one of the one or more chemical storage tanks provides one or more chemicals to the spin-rinse-dry modules.

36. (New) The deposition system of claim 21, further comprising one or more spin-rinse-dry modules disposed in connection with the mainframe.

SubDS

37. (New) The deposition system of claim 21, further comprising a pass-through cassette disposed above the spin-rinse-dry modules.

38. (New) An electro-chemical deposition system, comprising:
a mainframe having a mainframe wafer transfer robots disposed therein;
one or more processing stations disposed in connection with the mainframe,
wherein each processing station comprises one or more electrochemical deposition cells;
one or more cleaning modules disposed in connection with the mainframe; and
one or more post deposition treatment chambers disposed in connection with the mainframe.

39. (New) The deposition system of claim 38, wherein the one or more loading station robots transfer wafers between the one or more cassette receiving areas and the one or more cleaning modules.

C 3 40. (New) The deposition system of claim 38, wherein the one or more loading station robots transfer wafers between the one or more cassette receiving areas and the one or more post deposition treatment chambers.

41. (New) The deposition system of claim 38, further comprising an electrolyte replenishing system disposed about the mainframe.

42. (New) The deposition system of claim 38, further comprising a pass-through cassette disposed above the cleaning modules.

43. (New) The deposition system of claim 42, wherein a processed wafer is transferred from the one or more electrochemical deposition cells into the pass-through cassette and transferred from the pass-through cassette using the loading station robots to the one or more post deposition treatment chambers.